

## WHAT IS CLAIMED IS:

 1. A reactor for producing a high molecular weight polyester, comprising:

(a) a substantially horizontal cylindrical vessel provided with an inlet and an outlet for a liquid feed, respectively, at the lower part at one end thereof and at the lower part at the other end thereof in the longitudinal direction thereof, and with an outlet for volatile matters at the upper part thereof,

(b) a stirring rotor provided with a plurality of hollow disks as connected to one another in the longitudinal direction thereof within the cylindrical vessel, and

(c) further provided with scraping plates each between adjacent hollow disks, for scraping the liquid feed attached to the inside wall of the vessel, the stirring rotor being without any rotating shaft at the position of a rotating center axis,

wherein the distance between adjacent hollow disks is larger at the one end of the longitudinal direction of the vessel than at the other end, the inner diameter of the hollow disks is larger at the one end in the longitudinal direction of the vessel than at the other end, and the scraping plate at the other end is discrete between the adjacent hollow disks.

2. A reactor for producing a high molecular weight polyester, comprising:

(a) a substantially horizontal cylindrical vessel provided with an inlet and an outlet for a liquid feed, respectively, at the lower part at one end thereof and at the lower part at the other end thereof in the longitudinal direction thereof, and with an outlet for volatile matters at the upper part thereof,

(b) a stirring rotor provided with a plurality of hollow disks as connected to one another in the longitudinal direction thereof within the cylindrical vessel, and

(c) further provided with scraping plates each between adjacent hollow disks, for scraping the liquid feed attached to the inside wall of the vessel,

wherein the stirring rotor is without any rotating shaft at the position of a rotating center axis, the distance between the adjacent hollow disks is larger at the one end in the longitudinal direction of the vessel than at the other end, the inner diameter of the hollow disks is larger at the one end in the longitudinal direction of the vessel than at the other end, and a hollow thin plate is provided between the adjacent hollow disks at the one end, the hollow thin plate having a smaller outer diameter than that of the adjacent hollow disks.

2. A reactor for producing a high molecular weight polyester, comprising:

(a) a substantially vertical cylindrical vessel provided with an inlet and an outlet for a liquid feed, respectively, at a lower side part thereof and at the bottom at the center

thereof in the longitudinal direction thereof, and with an outlet for volatile matters at the top thereof,

(b) a heating medium jacket provided around the outer periphery of the vessel body,

(c) a heat exchange section at a lower part within the vessel,

(d) a residence section with helical baffle plates at an intermediate position within the vessel for retaining and successively transferring the liquid feed from above downwards, and

(e) a space for gas-liquid separation at an upper position within the vessel and a down pipe at the center in the vertical direction of the vessel for flowing down the liquid feed as a thin film therethrough.

4. A natural circulation evaporator without any mechanical stirrer, for producing a high molecular weight polyester, comprising:

(a) a vertical cylindrical vessel provided with an inlet and an outlet for a liquid feed on the vessel body,

(b) a vapor pipe at the top of the vessel for discharging vapors, and

(c) a heating medium jacket around the outer periphery of the vessel and a shell-and-tube heat exchanger within the vessel, for heating outsides of the tubes and allowing the liquid feed to rise through the tubes, while the liquid feed flows downwards by natural convection between the inner wall of the vessel and the outer wall of the shell of the shell-

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